User's ▶▶▶▶▶ Manual

24-Port 10/100/1000M Web-Smart Switch

HGS24S

Please place main product photo here.

HAWKING® TECHNOLOGY

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FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limitations are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet from the one that the receiver is connected to.
- Consult your local distributors or an experienced radio/TV technician for help.
- Shielded interface cables must be used in order to comply with emission limits.

Changes or modifications to the equipment, which are not approved by the party responsible for compliance, could affect the user's authority to operate the equipment.

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This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

LIMITED WARRANTY

Hawking Technology guarantees that every HGS24S 24-Port 10/100/1000M Web-Smart Switch is free from physical defects in material and workmanship under normal use for two (2) years from the date of purchase. If the product proves defective during this two-year warranty period, call Hawking Customer Service in order to obtain a Return Authorization number. The warranty is for repair or replacement only. Hawking Technology does not issue any refunds. BE SURE TO HAVE YOUR PROOF OF PURCHASE. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. When returning a product, mark the Return Authorization number clearly on the outside of the package and include your original proof of purchase.

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Table of Contents

HGS24S 24-Port 10/100/1000M Web-Smart Switch

The complete HGS24S package consists of:

- One HGS24S 24-Port 10/100/1000M Web-Smart Switch
- Rack mount kit: 2 mounting brackets and screws
- Four rubber feet with adhesive backing
- One AC power cord
- One RS-232 cable
- One CD
- One Quick Installation Guide

Check to make sure that the unit was not damaged during shipping and that no items are missing. If you encounter a problem, please contact your dealer.

Please read this user's manual thoroughly, and follow the installation and operation procedures in the following pages.

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1.1 General Description

The device is a 24-port 10/100/1000Mbps Ethernet Web-Smart Switch.

Compared with traditional 10/100Mbps Ethernet, the switch delivers a dedicated Gigabit connection to every attached client with no congestion issues. The gigabit ports also provide a larger pipe to the server or backbone connectivity for boosting total system performance. The N-Way auto-negotiation (or auto-sense) function (refer to the chapter titled, "N-way Process") automatically adjusts the device for optimum operation. Duplex mode provides an easy way to integrate 10/100/1000Mbps networks without hassles. Each port delivers up to 2000Mbps throughput, and is able to operate in either half or full-duplex modes. Under full-duplex mode, transmission and reception of frames occurs simultaneously without causing collisions while doubling the network bandwidth.

The HGS24S is ideal for micro-segmenting large networks into smaller, connected subnets for improved performance, enabling the bandwidth required by today's networks for increasingly demanding applications of all kinds. Also, unlike traditional "dumb" switches, the HGS24S features embedded advanced management capabilities: the device can be managed via web-based UI or console port, thereby allowing the system manager to monitor and control the system efficiently. "Store-and-Forward" architecture allows for low latency, eliminates error packets (including runt and CRC error packets) and improves efficiency. The switch is plug-n-play without any software to configure and is fully compliant with all the major network protocols. Moreover, the rich diagnostic LEDs on the front-panel give the user an easy view of the operating status of individual ports or the entire system.

1.2 Gigabit Ethernet Technology

Gigabit Ethernet is an extension of the IEEE 802.3 standard, and can deliver up to a tenfold increase in throughput over 100-Mbps Fast Ethernet and up to a hundredfold increase over 10-Mbps Ethernet. It utilizes the same packet structure and format, as well as support for CSMA/CD protocol, full duplex, flow control, and management objects. Because Gigabit

Ethernet is compatible with all 10-Mbps and 100-Mbps Ethernet environments; it provides a seamless upgrade without wasting existing investments in hardware, software, and/or trained personnel. With increased speed and more bandwidth, Gigabit Ethernet is a great solution for reducing network bottlenecks that frequently develop as computers and their buses get faster, and more users generate ever-greater traffic through the use of increasingly advanced applications. Upgrading key components, such as backbones and servers, to Gigabit Ethernet can greatly improve network response times and significantly increase the speed of traffic between your subnets.

Gigabit Ethernet supports video conferencing, complex imaging, and similar data-intensive applications. Likewise, since data transfers occur at speeds up to 10 times greater than Fast Ethernet, servers outfitted with Gigabit Ethernet NIC's (Network Interface Cards) are able to perform 10 times the number of operations in the same amount of time.

1.3 Key Features

- 24 fixed 10/100/1000Mbps Gigabit Ethernet ports
- Provides Auto-discovery Function for easy network management
- Provides 8K MAC address entries
- 24 groups VLAN table
- Supports up to 8 groups (of up to 8 ports each) port aggregation
- Supports QoS-TOS, Shaper, Policer and Storm for enhanced network management
- Supports full duplex flow control and half duplex back pressure
- Store-and-forward forwarding scheme
- Error packet filtering
- Supports Jumbo frame 9.6KB
- Supports 400K buffer memory
- Supports local Console Port or Web-based UI for configuration
- Internal switching power supply (100-240VAC/50-60Hz)

1.4 Front Panel

<p style="text-align:center; color:red; font-weight:bold;">Please place photo of customized front panel here.</p>

Port Operation

There are 24 * 1000Mbps RJ-45 (copper) ports on the front panel. The switch's auto-negotiation feature allows each port of the device to be running at one of the following operation modes:

Speed	Duplex Mode
10Mbps	Full Duplex
	Half Duplex
100Mbps	Full Duplex
	Half Duplex
1000Mbps	Full Duplex

All ports support MDI/MDI-X **auto-crossover**, meaning that the port can connect a PC or other device without crossover cable adjustment.

Wiring for 10/100/1000Mbps (Copper)

Below is the summary of the cabling required:

Media	Speed	Wiring
	10Mbps	Category 3,4,5 UTP/STP
10/100/1000Mbps copper	*100Mbps*	Category 5 UTP/STP
	1000Mbps	Category 5,5e UTP/STP

LED Definition

The rich diagnostic LEDs on the front panel help display the operating status of individual ports as well as the entire system.

Power LED
This indicator is lit green when the switch is receiving power; otherwise, it is off.

Port LEDs
Every RJ-45 port on the front panel has two LEDs (10/100M, 1000Mbps) for indicating the connection speed and activity status.

Port LED Summary Table:

LEDs	Status	Statement
10/100M	Steady /Blinking Amber	Connected as 10Mbps/Active
	Steady/Blinking green	Connected as 100Mbps/Active
1000M	Steady/Blinking green	Connected as 1000Mbps/Active

If the port is connected but the Port LED is dark, check the following items:

·   If the switch's and the connected device's power are on or not
·   If the connecting cable is good and of the correct type
·   If the cable is firmly seated in its connectors in the switch and in the associated device
·   If the connecting device, including any network adapter, is well installed and functioning properly

1.5 Rear Panel

Please place photo of customized rear panel here.

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This switch can be placed directly on your desktop, on the floor, or mounted in a rack. Users can immediately use most of the features simply by attaching the cables and turning the power on.

2.1 Desktop Installation

For desktop installation, the switch needs to be put on a clean, flat desk or table close to a power outlet. After you have plugged in all network cables and the power cord, the system is ready.

Before installing the switch, you must ensure that:
1. It is accessible and cables can be connected easily
2. Cabling is away from:
   a. Sources of electrical noise such as radios, transmitters and broadband amplifiers
   b. Power lines and fluorescent lighting fixtures.
3. Water or moisture will not enter or come in contact with the switch at any time
4. Airflow around the unit and through the vents on the side of the case is ample for heat dissipation (it is recommended that you provide a minimum of 25 mm. of clearance).

To prolong the operational life of your unit:
1. Never stack more than eight freestanding units on top of each other
2. Do not place objects on top of any unit or stack
3. Do not obstruct any vents at the sides of the case

2.2 Rack-Mount Installation

The switch may stand alone, or may be mounted in a standard 19-inch equipment rack. Rack mounting produces an orderly installation when you have a number of related network devices. Rack mounting brackets and screws have been included in the packaging for the switch. They are used for rack mounting the unit.

The following describes a general sequence of steps for securing the unit on a rack:

1. Disconnect all cables from the switch before continuing.
2. Place the unit right side up on a hard, flat surface with the front facing towards you.
3. Place one mounting bracket over the bracket mounting holes on each side panel of the unit.
4. Insert the screws (included in the rack mount kit) through the bracket and, using a screwdriver, secure the screws into the bracket mounting holes on the unit.
5. Place the unit onto the rack by securing the mounting brackets to the mounting strips on either side of the rack. To do this, align the holes on the mounting brackets with the appropriate holes on the mounting strips. Be sure to use four screws (two for each bracket) that are meant for use with the specific rack that you will be mounting the unit on. (These screws are provided or specified by the manufacturer of the *rack*, not by Hawking Technologies.)
6. Reconnect all cables.

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2.3 Installing Network Cables

Station Connections

Refer to the wiring statement of the previous section; connect each station/device to the switch with the correct cables.

Switch-to-Switch Connections

In making a switch-to-switch connection, using every port to connect another switch or backbone is strongly recommended. The gigabit ports provide a larger pipe to the server or backbone for boosting the total system performance.

Furthermore, as the switch supports Port Aggregation (Port Trunk) capabilities and up to 8 groups, it is also great for building switch-to-switch connectivity.

2.4 Network Application

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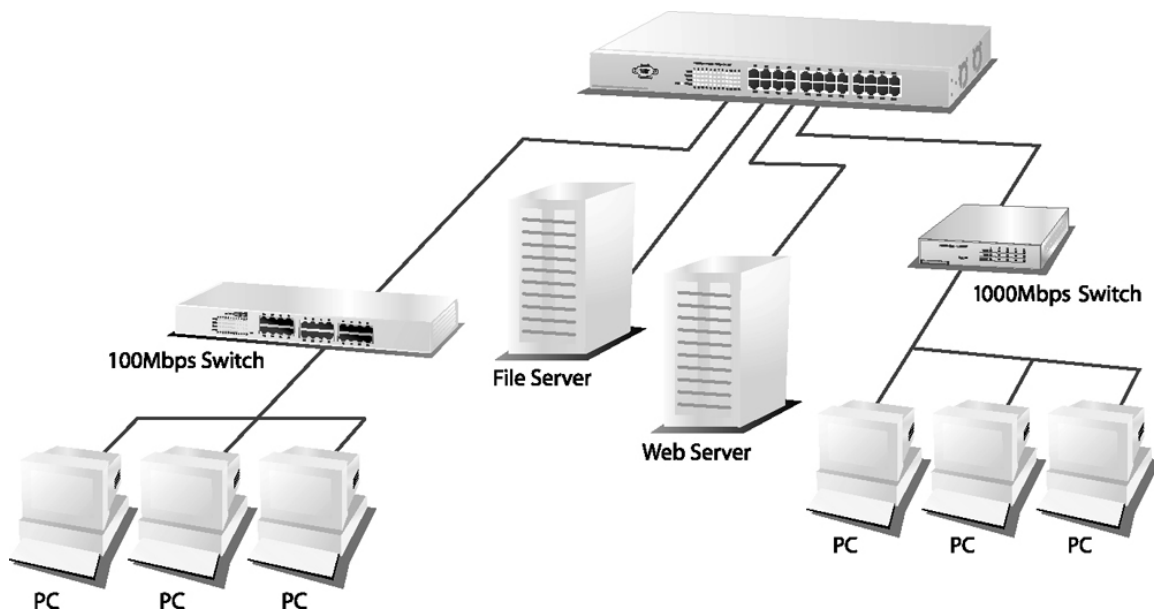
3.1 PHY Monitoring and Port Mode Setup

One of the software's major tasks is to continuously monitor the PHYs in order to set up the switch ports according to whether the link is up or down, and in the latter case, what the current speed, duplex mode and pause capabilities are. The PHYs are polled every 100 ms.

3.2 Flow Control

In the 16-port switch, flow control (back pressure) is also supported in half duplex. Flow control can be enabled or disabled on a per-port basis from the command line interface.

If flow control is enabled for a port, the associated PHY will be set to advertise support of "Symmetric Pause", but not "Asymmetric Pause". If the station connected to the port also supports "Symmetric Pause", flow control will be enabled on the switch port.

3.3 Aging

To prevent that an automatically learned MAC address of a station that has been detached will remain in the MAC address table permanently, the aging function in the switch is activated on a regular basis. The period for the aging function is determined by the aging time parameter. The aging time parameter can be set from the command line interface. The default value is 300 seconds. Setting the aging time parameter to 0 disables the aging function.

3.4 VLAN

Port-based VLAN can be defined statically. GVRP (Generic/Group VLAN Registration Protocol) is not supported. A maximum of 24 VLANs can be stored in EEPROM.

3.5 Link Aggregation

Link aggregation groups (or channels) can be defined statically. LACP (Link Aggregation Control Protocol) is not supported. The maximum number of aggregation groups is 8. The software will automatically detect that a link has gone down and then reassign packet distribution on the other links in the group.

3.6 Quality of Service

Various classifications and prioritizations such as TOS, Shaper and Storm are supported in order to enable Quality of Service for real time applications such as VoIP (Voice over IP).

Management Guide
HGS24S 24-Port 10/100/1000M Web-Smart Switch

This section instructs you on how to enter and set up the configurations, which can be accessed by RS-232 serial port (out-of-band) on the rear panel or by Telnet session / Internet Browser over the network (in-band).

Factory Default value:

IP: 192.168.1.1
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.254

4.1 Access the Switch

Console Port (Out-of-band) connection

The operating mode of the console port is:

- DCE
- 115200 (Fixed baud rate)
- n (No parity checking)
- 8 (8 Data bits)
- 1 (1 stop bit)
- None (No flow control)

After attaching the RS-232 cable (Straight-through) to the serial port of a PC running a terminal emulation program, press the **"Enter"** key. A login screen will then appear. Enter your username and password to log into the management console.

Note:

The management functions of the console program are exactly the same as the web-based management interface but in text mode.

> **Attention: 1.** The factory default User Name and Password are both
> **"admin"**.
> **2.** System configurations via the Console Port will only be allowed
> by way of the master device.

Management Guide

HGS24S 24-Port 10/100/1000M Web-Smart Switch

<u>**In-Band Connections (Web Browser / Telnet)**</u>

To manage the switch through in-band access, you should configure the management station with an IP address and subnet mask compatible with your switch.

1. Run your Web Browser and enter the IP address "192.168.1.1" as the URL in the "address" field.
2. Key in the User name and password to pass the authentication. The factory default User Name and Password are both "**admin**".

Enter Network Password

Please type your user name and password.

Site: 192.168.1.1

Realm Gigabit Web Smart Switch

User Name

Password

☐ Save this password in your password list

OK   Cancel

3. After the authentication procedure, the switch's homepage will appear.

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4.2 Homepage

On the Home page, you can select what you would like to configure by clicking the menu tabs located at the top of the homepage.

They include:

- System
- Ports
- VLANS
- Aggregation
- QoS
- Mirror
- Statistics
- Discovery

Example of place where you will need to replace generic homepage with screenshot of customized page with Hawking logo.

Configuration Tabs

Detailed Port Statistics

Management Guide

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To restore the **default** values of switch, click the "**Default**" button at the top of the homepage. If you want to **reboot** the switch, click the "**Reboot**" Button. To check the connection status of each port, from 1 to 16, take a look at the port monitor. When the port shows **green**, it is connected. Otherwise it will remain **dark**. To know the detailed statistics for each port, click on it and the window will show.
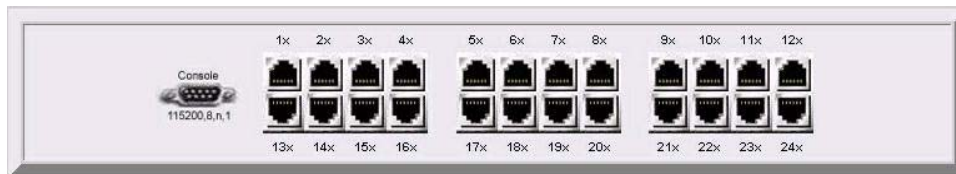
Port 1 Detail Statistics

Clear Refresh

Receive Total		Transmit Total	
Packets:	647	Packets:	237
Octets:	83914	Octets:	79395
High Priority Packets:	648	High Priority Packets:	0
Low Priority Packets:	0	Low Priority Packets:	240
Broadcast:	407	Broadcast:	1
Multicast:	28	Multicast:	0
Receive Size Counters		Transmit Size Counters	
64 Bytes:	246	64 Bytes:	65
65-127 Bytes:	230	65-127 Bytes:	32
128-255 Bytes:	128	128-255 Bytes:	49
256-511 Bytes:	42	256-511 Bytes:	14
512-1023 Bytes:	5	512-1023 Bytes:	80
1024- Bytes:	0	1024- Bytes:	6
Receive Error Counters		Transmit Error Counters	
CRC/Alignment:	0	Collisions:	0
Undersize:	0	Drops:	0
Oversize:	0		
Fragments:	0		
Jabbers:	0		
Drops:	0		

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4.2.1 System

To set up the system configurations such as login values, time-out values, and for enabling the VLAN Management:

Items	Functions
Mac Address	The Mac Address of the switch
S/W Version	To look up the Software Version, see here.
H/W Version	The Hardware version
Inactivity Timeout (Secs)	Set the console inactivity timeout in seconds. The value zero disables the timeout. Timeout value in seconds, 0, 60-10000.
System name	Name of the Switch
IP Address	Set the IP Address of the Switch
Subnet Mask	Set the Subnet mask of Switch
Gateway	Set the Gateway of Switch
Name	The Login name (default admin)
Password	The Login password (default admin)

To save the configuration of the system, click "**Apply**".

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Note:

After you change the IP address, the switch will reboot itself. You may click the new address to link the New IP Address with your browser.

4.2.2 Ports

On this page, you can view the port status, set up the speed "Mode" and enable the "FDX Flow Control".

Items	Functions
Link	Shows the status of each port. When it is red, it means the connection is down. Otherwise, it is green.
Mode	Choose the Speed mode of port: 10/100/1000, Half/Full. To disable the port, choose "Disable". If you set to auto-speed, it will be auto-negotiation.
FDX Flow Control	To Enable the FDX Flow control, click the check box.
Max Frame length	To adjust the Frame length, enter the value you want. The larger the value is, the better network performance you will have. The default is 1518. The Maximum value is 9600.

To save the configuration of the system, click "**Apply**". To see the latest port status, click the refresh button.

4.2.3 VLANs

VLAN configuration is for dividing the LAN into subnet groups for better network management. The benefit is that the user can move one client to another subnet group without physically moving the machine. There are up to 24 entries to set up.

- To add a new VLAN entry,
  1. Select the ports by clicking their respective check boxes.
  2. Enter the VLAN ID number for the entry.
  3. Click "Add" to add it in the table.
  4. Don't forget to click the "Apply" button to save the settings.

- To remove the entry,
  Select the entry you want to remove, and click "Remove" to delete it.

  Note: When the PVID is the same as the VID, the entry cannot be removed.

- To modify the entry,
  Select the entry you want to change and set up the new configurations. After the changes are made, click "Modify" to save.

  Caution: Because the settings for VLAN, Port Aggregation, and Mirror are dependent upon each other, make sure that the settings will not influence the others. Do not activate more than one function per port.

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PVID

When the VLAN-enabled switch receives a tagged packet, the packet will be sent to the port's default VLAN according to the PVID (port VLAN ID) of the receiving port.

Items	Functions
Port	Port Number 1~16
PVID	Port VLAN ID
Aware	To enable the PVID checking and inserting of one port, select "AWARE"
Only Tagged	Block the untagged frame.
Apply	Don't forget to Click "Apply" to save the changes you made.

VLAN Entry   PVID

AWARE:
Set or show the VLAN awareness mode for the port. VLAN aware ports will look the VLAN tag from received frames and insert the tag in transmitted frames. VLAN unaware ports will not look the tag from received frames or insert the tag in transmitted frames.
Only Tagged:
Accept only tagged frame from this port.

PORT	PVID	AWARE	OnlyTagged
1	1	☐	☐
2	1	☐	☐

4.2.4 Aggregation/Trunking Configuration

To set up the Port trunk groups, put the port numbers into the same Aggregation group line. There are eight groups that can be made. Do not forget to click the "Apply" to save the settings. The maximum number of ports for one group is 8. There are three aggregation modes for you to setup, SMAC (Source MAC), DMAC (Destination MAC), and XOR.

4.2.5 Qos

There is one mode of Quality of Service to choose: custom TOS.
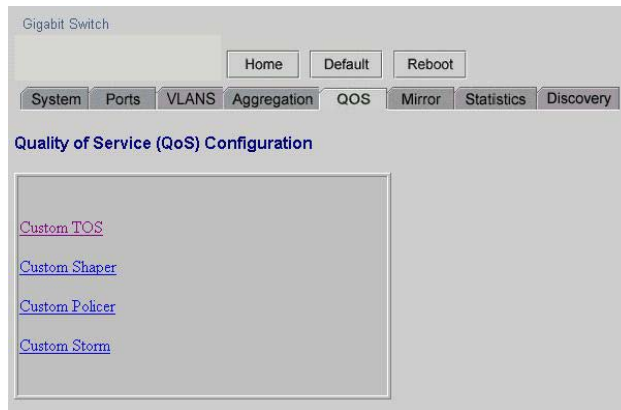
4.2.5.1 Quality of Service (QoS) TOS Configuration

To improve the network performance by applying the TOS, set up the priority of eight groups of precedence bits on this page. There are two types to choose, high or low.

Items	Functions
Port	To select the switch port, from 1 to 16
Priority	Select the priority of the TOS group

This the type of Precedence:

    111 - Network Control
    110 - Internetwork Control
    101 - CRITIC/ECP
    100 - Flash Override
    011 - Flash
    010 - Immediate
    001 - Priority
    000 - Routine

4.2.5.2 QoS Port Shaper

To control the port data's flow rate, select "Enable" and enter the value you need from 250 - 1000000Kbps. Any packet size that is larger than the limit will be discarded. Click "Apply" to save.

4.2.5.3 QoS Port Policer

To control the port data's flow rate, select "Enable" and enter the Value you need from 250 - 1000000K bps. If the packet size that is larger than the limit, the switch will make the associated client suspend the frame transmission by using back pressure or pause frame. Click "Apply" to save.

Port's Policer Configuration

Port	Enable/Disable	Rate(250~1000000Kbps)	
1	Disable	250	kbps
2	Disable	250	kbps
3	Disable	250	kbps
4	Disable	250	kbps
5	Disable	250	kbps

4.2.5.4 QoS Port Storm

To prevent a broadcast storm, the switch provides the multicast packet size setting. You can select "Enable", enter the value, and click "Apply" to activate the setting.

Port's Storm Configuration

Port	Enable/Disable	Rate(250~1000000Kbps)	
1	Disable	250	kbps
2	Disable	250	kbps
3	Disable	250	kbps
4	Disable	250	kbps
5	Disable	250	kbps

4.2.6 Mirror

Port mirror is used to mirror traffic from a source port to a target port for analysis. Only 2 ports can be monitored (mirrored) simultaneously to 1 Monitor port (target port). (Note that the target port must be in the same VLAN as the source port.)

Items	Functions
Monitor Port	Select the switch port, from 1 to 16 to be the target port to collect traffic info
Source Ports	To select the mirror ports, click the check box of the port.

Do not forget to click "**Apply**" button to save the configuration.

4.2.7 Statistics

To check the status of port traffic, click the "Statistic" tab. You can click the "**Clear**" button to erase all records or click "**Refresh**" to show the most current status.

Statistics Overview for all ports

Port	Tx Bytes	Rx Bytes	Tx Frames	Rx Frames	Tx Errors	Rx Errors
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

4.2.8 Discovery

When you install several our 16-port and 24-port gigabit web-smart switches, the discovery management tool helps you to search and access those switches on the LAN easily. Therefore you can access any switch on your LAN without memorizing those IP addresses. You can only find switches with the IP Address compatible with the one you access.

Note: The Maximum number of Address lists is 16 for each mode.

Auto Search
1. Click the "Auto search" button to find the switches.
2. The IP address & name of the switch list will appear.
3. Click the one you want to access.

Discovery

Auto Search [Apply]

1	10.10.14.127	frankie1

Manual Add
 ADD
1. Enter the IP address & name in the text box
2. Click "**Add**" to add the new IP address on the table
 Remove
1. Click the check box of the one you want to remove
2. Click "**Delete**" to remove.

Manual Add
IP Address: [   ] Name: [   ] [Add]

1	10.10.10.10	1	modify	☐ [Delete]

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4.2.9 Default

To restore to default values,
    1. Click the default button on the homepage.
    2. Click "Yes" to restore default values. Do not power off the switch while it is working.

Factory Default

Are you sure you want to perform a FACTORY DEFAULT? Yes No

This will only restore the factory defaults. No *Warm Restart* will be performed. Perform manually if desired.

4.2.10 Reboot

To reboot the switch,
    1. Click the "Reboot" button on the homepage
    2. Click "Yes" to reboot. Do not power off the switch while it is working.

Warm Restart

Are you sure you want to perform a Warm Restart? Yes No

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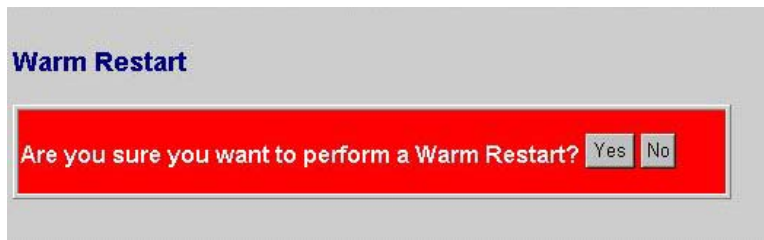
Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x full-duplex operation and flow control IEEE802.3ab 1000BASE-T IEEE802.1Q VLAN interoperability IEEE802.1p Traffic prioritization
Interface	24 * 10/100/1000Mbps auto MDI/MDI-X RJ-45 switching ports 1 * RS-232 Console port
Cable Connections	RJ-45 (10BASE-T): Category 3,4,5 UTP/STP RJ-45 (100BASE-TX): Category 5 UTP/STP RJ-45 (1000BASE-T): Category 5,5e or enhanced UTP/STP
Network Data Rate	10/100/1000Mbps Auto-negotiation
Transmission Mode	10/100Mbps Full-duplex, Half-duplex 1000Mbps Full-duplex

LED indications	System:
	    Power
	RJ-45 Port:
	    10/100M; 1000M link/activity

Memory	8K MAC entries 400K Buffer Memory
Emission	FCC Class A, CE
Operating Temperature	$0^0 \sim 50^0$C ($32^0 \sim 122^0$F)
Operating Humidity	10% - 90%
Power Supply	Internal power supply 5V 10A 100-240V/ 50-60H

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